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Adaption of Moodle as E-Learning in Saudi Arabian University: Empirical Examination and its Outcomes Using TAM

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Abstract

Modern universities increasingly rely on e-Learning management systems to ensure their students have a richer and more-efficient learning experience. The choice and adaption of such systems need careful evaluation to achieve their intended goals. This paper describes the experience of using Moodle as an e-Learning System in Shaqra University, Saudi Arabia. The paper describes the benefits of the system and highlights the problems that were encountered while adapting it. It also explains an analysis study which uses an acceptance model to assure the adaptability of the system in the university by the stakeholders. The study confirms the importance of the project for the university and its impact on the working ethics for the employees as well as the students.

Keywords: Automatic assessment; e-learning; Moodle; System Adoption; TAM.

1. Introduction

Shaqra University is one of the Universities in the Kingdom of Saudi Arabia. The university is located in the center of the kingdom and due to the large amount of population within its geographic area, the university has several branch campuses within the central region of the Kingdom. The College of Computing and Information Technology (CCIT), which is one of several colleges in the university, offers a degree in Computer Science which introduces the most important topics of computer and information technology to its students. This degree runs under the department of computer science which is available in 9 branch campuses in 9 different cities across the central region. This degree follows the American credit system in which all subjects require ample amount of practical work to be completed.

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Each subject is designed so that any enrolled student should earn a minimum of 60 credits similar as discussed in[1]. A key objective of the computer science degree emphasizes the transfer of the computer science knowledge to students in various areas such as database management system, networks, programming, operating systems, software engineering, computer security, cyber forensics, digital logics, simulation and so forth.

Throughout the teaching, assessing students' performance as well as performing a continuous functional evaluation of the courses offered by the department are carried out by our lecturers. For that to be achieved smoothly, our lecturers must use tools which are capable to handle students' assessments and provide feedback in a timely and efficient manner. Performing this in classes / groups with large number of students could be a time consuming task [2] whereby providing a feedback to every student is difficult on a regular basis. To overcome this problem and to accomplish the objectives of the department as well as the university of working efficiently in a fast and simple manner to evaluate students, having an e-learning was necessary [3]. This study emphasizes on the adaption of the Moodle based system in Shaqra University. Furthermore, it tells us the experience of the Moodle System after its deployment in consequent phases. At the end a Technology Acceptance Modal is used to identify the testing and adaptability of the Moodle system at the university.

2. Literature Review

The need of automatic assessment of students work as well as using automated tools in teaching has been highlighted in the literature, where the need of such adoption was highlighted in [4,5]. Computer technology can be used effectively to deliver an efficient work environment for the lecturers and improve students' performance [6], gives a very simplified mode of execution of plans[7;8] and a medium of communication between lecturers and students. Various studies deal with the detection of plagiarism and discuss means of avoiding it, this is due to the fact that plagiarism has become common in the digital era [9,10]. This topic has acquired less attention in the field of computer science in which the primary efforts concentrate on teaching tools and not on the integrity[11]. Yet, some developments were made on the field of automatic assessment [12;13].

Learning Management Systems (LMS) has a positive impact on the process of learning and teaching. These platforms provide web-based and mobile-based interfaces which generally support a very wide range of activities that can be of prior importance in learning [14]. These activities include forums, contents, questionnaires, chats, assignments and many more [15]. These platforms are very effective in implementing various constructive approaches which contain basic building of knowledge of the students and various other activities which are helpful for the teaching staff[16]. The utilisation of web-based platforms is very easy from students' point of view and the staff members can also use it up to a greater extent[17]. The students find it a very simple approach in which all the materials and information are available on their fingertips[18]. The use of collaborative learning is also an important factor in web-based learning methodologies that can complement to various constructive teaching mechanisms[19].

The "Moodle" which is short for (Modular Object-Oriented Dynamic Learning Environment) a popular Learning Management System (LMS). At the beginning of 2010, there were about 45,000 validated registered sites, and being widely used in higher and university education [20]. This LMS has been selected by the College

of Computing and IT at Shaqra University to be the university online teaching & learning platform. The most exciting feature of this LMS is being an open source system. This fact with its modularity for open interfaces and collaboration with various other modules as well as its simple design make it easy for the developers and designers to use new modules and help them to generate various smart learning management systems that are capable enough for doing wonders in learning and teaching.

3. Implementation of Moodle

In 2015, the university comprehended the need for an efficient and effective system to help its staff and students in the learning and teaching activities. The students were also in a search for a system which could make their learning experience more interesting. The staff on the other hand, either those in the CCIT or other colleges were in need for a platform which could make the communication between them and the students more effective. For some reasons, the adoption of Moodle at that time was not simple; however, on a testing basis, the system was deployed for a limited number of lecturers (around 15 lecturers) and approximately a hundred students. The initial phase of the system was limited to the sharing the information between faculty and the students. However, later on, some more features of the Moodle system were added. The adoption of the system was found to be useful, thereby giving rise to approximately 90 lecturers in the system and more than 500 students. The system comprises of two servers that were used, in which one of the main Moodle server was acting as the base and another server was acting as a backup server. The system was designed to provide a simple interface and more functionalities for the students to make it effective and elegant. A specific Moodle theme module was designed to provide the best support for the assignments and teamwork with the help of consecutive processing [21]. The goal of this adoption is to support automated assessment mechanism and to encourage more effective communication between staff and students. The use of the LMS has made it clear that having a paperless teaching and learning environment seemed feasible. However, there were some issues that were encountered at that time which will be discussed later in this paper.

The Moodle system was implemented in CCIT keeping in mind various resources and factors that were responsible about providing quality education and easy mode of communication between staff and students. Lecturers and students (as the main beneficiaries of the system) were able to exchange information in a digital and systematic manner with the help of the system features. Various modules were activated in this learning management system that were responsible for delivering information to the students and managing contents by staff members easily. Several add-on features like notices and information, gradebook and evaluation, online quizzes, forums, chats, messages, course contents, assignments submission, profiling of a user, course enrolments…etc. were activated in order to provide a simple and effective mechanism to achieve quality education and exchange of information at the fingertips. Apart from these modules, several specific modules such as attendance management, Skype integration, plagiarism checking was also implemented.

The Moodle system has made it possible for all staff members and students of CCIT to access the information in the University network with a simplified and easy methodology. The LMS provides a simple mechanism that is capable enough for providing paperless environment and minimise the need of carrying laptops and flash drives from one part of the department to another. The staff members were comfortable enough to take care of their

data just by uploading it on their account on the LMS and access the information anywhere across the University network with a simple and effective method of logging in with their personal user ID and password.

As shown in the figure 1 below, the system was designed and deployed for the convenience of staff members and students while executing the learning and teaching activities. The learning and teaching process was made simple with the use of such e-Learning mechanism. The two major stakeholders of the system were the Faculty of CCIT and the students across the university network. Teaching plans and lectures of different courses were accessible to all students who use this system as well as the courses' assignments and evaluations could be done easily by the students.

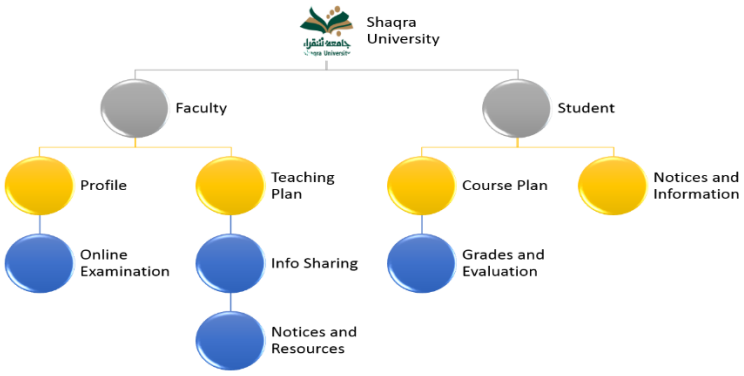

Figure 1: The Moodle LMS at Shaqra University (2015)

3.1 Experience during first year (2015-16)

The most important part of any LMS is the hosting of the system itself. The stand-alone nature of the e-learning server makes it very powerful and adaptable across universities as per the observations during the implementation phase. In the early phases of the system development and design, the Moodle system was used on an intranet network that was accessible by a handful of users. The accessibility of the system was made possible with a local server that was placed at the Department of computer science and IT. It was accessible with the help of a local URL that was supported by a secure socket layer encryption schema. The local intranet supported the system very well and it was free from any kind of viruses and/or malwares. Even if an internet failure occurs, the modal system was accessible through the intranet. Thus, the system was accessible at any time. Even if there was a system failure from the ISP, the system was accessible through a local IP address (http://10.10.166.5). The configuration of the server that was used to work with the intranet enabled having a concurrent 5000 users at a time. The set of concurrent users were able to access the entire range of services provided by the server and the maintenance of log is helpful to track any issues. Thus, the accessibility of the server in the absence of an internet was one of the strongest features for the LMS.

3.2 Experience during the second year (2016-17)

As mentioned above, in the early phase of the system implementation, there was a small number of users and

courses to test whether it will be accepted or not; roughly, there were 200 users with various roles in the system. Reports were created by the system did not exceed 1000 reports which were taken under consideration. The LMS, from the user perspective, was effective and was acceptable. Table 1 shows some statistics from the initial stage of the implementation.

Table 1: Moodle LMS statistics at Shaqra University (2016)

Number of courses	36
Number of users	186
Number of role assignments	634
Number of posts	9
Number of questions	46
Number of resources	63
Number of badges	1
Number of issued badges	2
Average number of participants	17.56
Average number of course modules	3.06

The number of courses that were available in the initial version of the system were 36 and targeted about 186 users including staff and students. However, there was no enthusiasm from staff or students which resulted in a low average number of participants per course (17 users). At the beginning, it was observed that the system was not desired, yet, the developers and system managers were certain about the usefulness of its functionalities as well as it feasibility, and therefore, it was deployed to all courses and users.

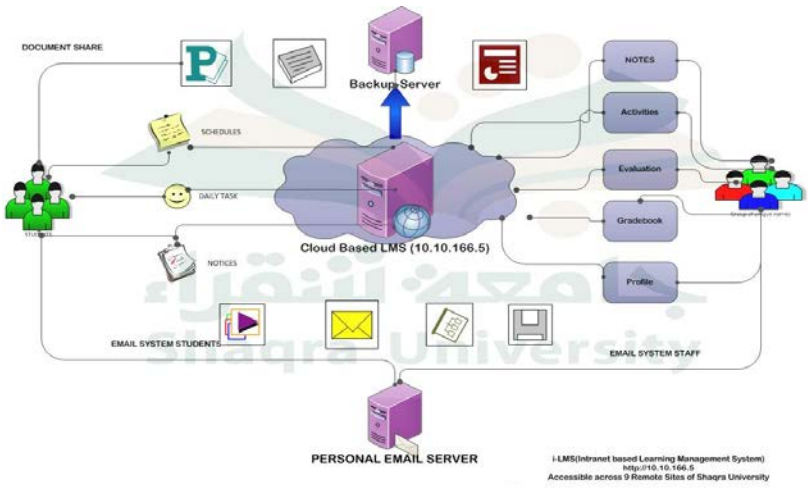

Figure 2: Phase of the Moodle LMS at Shaqra University 2016

By the end of 2016, the Moodle LMS was deployed across Shaqra University. The following show the key

success points:

1. The system was accessible across the 9 remote branch campuses of Shaqra University.
2. The system was robust and scalable in nature. It can accommodate for the increase in student numbers.
3. It is an Open source-based system which had no financial burdens.
4. A minimum of 4GB of RAM and 100GB of HDD were sufficient to handle the system, thus, the hardware was sufficient and did not require exhaustive maintenance.
5. There was no need for a third-part existence in the system for any kind of maintenance and therefore, it was a cost saving solution to the university.
6. The system was in testing phase and therefore, it only required accessibility within the university network.
7. It empowered the use of automation and paperless environment for the benefit of students and society.

Experience during the current year (2017-18), The i-LMS, which is short for "Internet – Learning Management System" (which was the name given to this project in the university) is created to address the need of automation and paperless environment as it the way followed in learning & teaching in the current century. Both staff and students were intended to use a system which should provide interactive learning methodologies and proper reasoning to create a society in which information is accessed easily in the desired format. The complete grades, course material, calendar, schedules, information and many other aspects are available in a click of button on a computer, a mobile or a tablet. The system aims to provide the administrators with reports which are of prime importance in the working requirement. The system provides a win-win situation for all stakeholders including students, faculty and administrators. This system is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments. The courses structure that was used by Moodle system contains topic formats that includes the activities shown in figure 3.

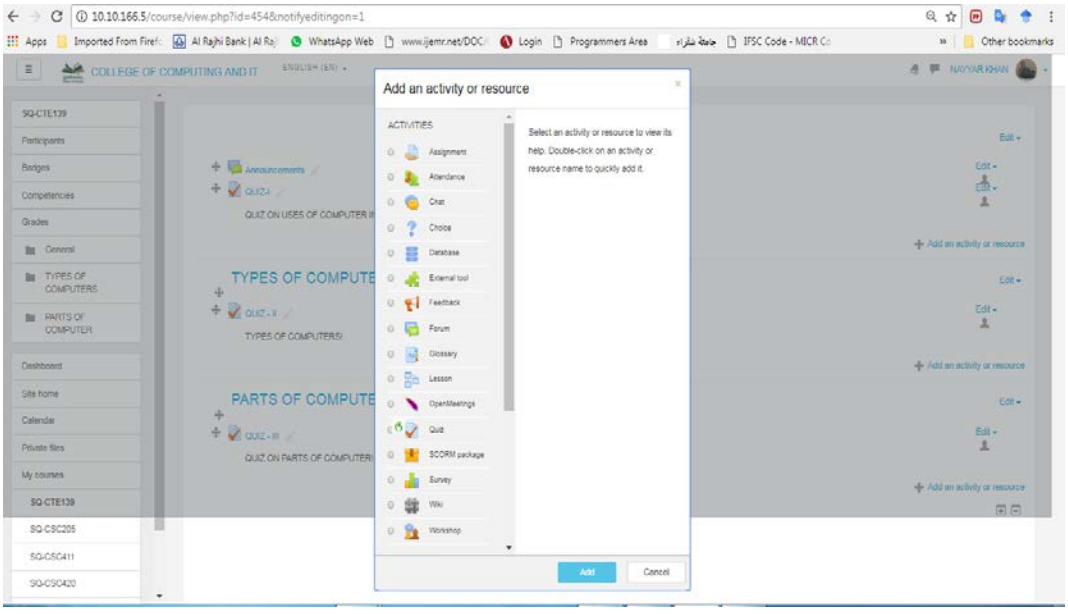

Figure 3: Moodle LMS Activities in the System.

There are various activities that are currently support by the i-LMS system. Some of the well-known and mostly used activities are:

- Uploading Presentations
- Quiz Online
- Chat
- Assignments
- Grade book
- Attendance
- Folder Management
- Surveys
- Polls
- Forum
- Question and Answer Section
- Presentation
- Lecture and Notes.

The modules that are activated for the submission may or may not be understood by the students up to a greater extent. This might be possible because of the capabilities and limitations of the use of e-learning or any learning management system that operates as a web service. At the beginning of any course, students get familiarized with the system by providing them with a user ID and password. The first assignment for the students is to update their details and information into the LMS system. As soon as the system information is updated, the student becomes comfortable with the usage of the system and then he/she can check out the various important details and the documents that are available in the course. The activities that are depicted in figure 3 are handled from the side of the lecturer. Students are expected to participate in the activities and show their creativity. In figure 4, a typical dashboard for staff members who has several courses enrolled in his system is shown. The bootstrap-based design makes the look and feel of the system excellent.

Even the staff members sometimes find it very difficult to deal with certain modules as far as the technical aspect is concerned. To overcome this hurdle, at the beginning of every semester, a training is given to selected staff members from various remote sites (i.e. Branch Campuses) at the Central Supply Centre. The training is

given to the people for each branch campus, who are able to provide and pass on the same information to the other staff members at their location. The training contains practical sessions for staff members and assignments are given to them to deal with the system effectively and taught them to troubleshoot any technical issues. All the queries and solutions are given to the lecturers by the technical experts of the system to make the lecturers comfortable with the system and to avoid any kind of technical issues that can arise because of the unfamiliarity with the system. In addition to that, in Moodle, the help files are available on the system to assist users troubleshoot any problems. The same methodology is applied on the students' side in which they are encouraged to practice self-learning that may yield a greater emphasis on real world problems and solutions; this is also essential for any kind of engineering studies. Once the staff member is sufficiently trained on a particular platform, he/she can easily use the system for the promised benefits. The same thing applied to students who can get all the information and evaluation completed within their fingertips[22].

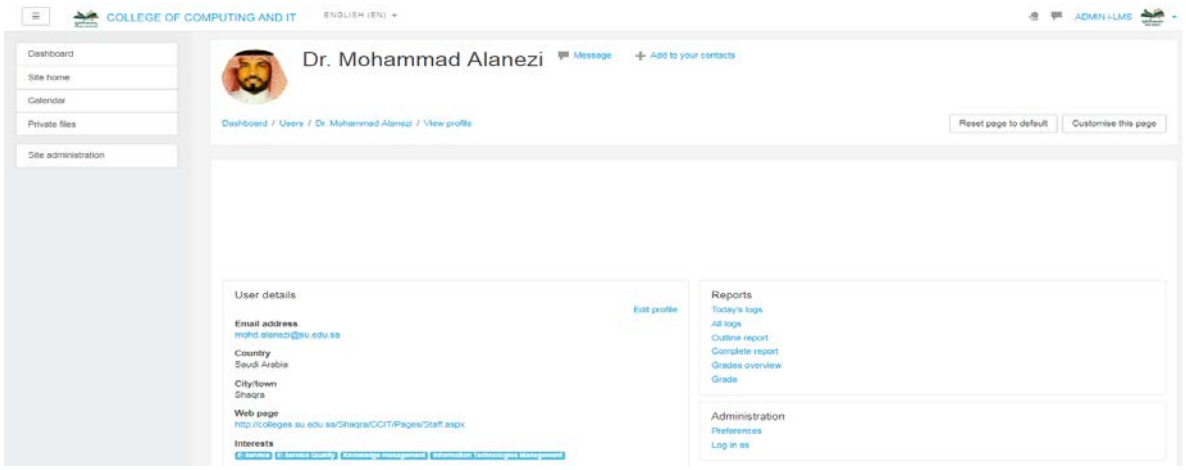

Figure 4: Current look of the Moodle LMS at Shaqra University 2017

The popularity of the system can be demonstrated with the statistics that are shown in figure 5. The acceptability of the system in the lecturers and the students can be well identified with the issues that are mentioned depending on the total number of participants.

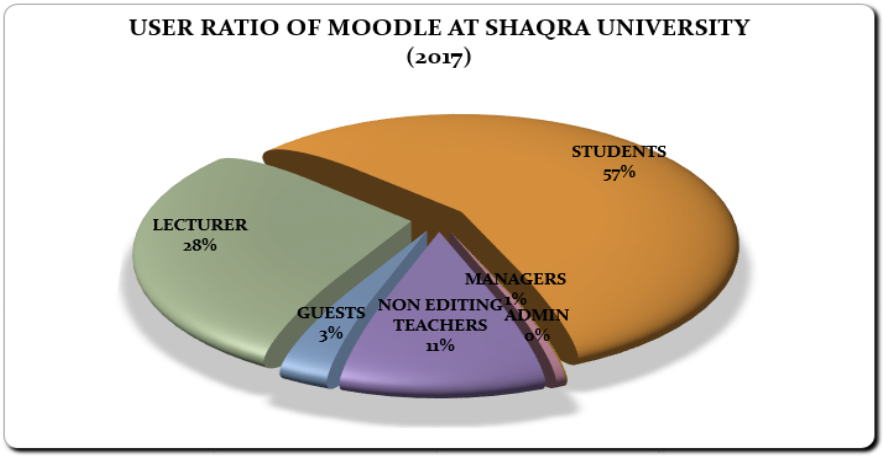

Figure 5: User Ratio of Moodle LMS at Shaqra University 2017

The activity logs in the Moodle system are based on the server-side scripts that were activated and noted since the three releases of the system. All the activities in the system are logged in a log file and the total count were checked. The final logs generated once during the semester is reviewed. The logs represent the total use of the system across any phase of time. It could be well justified that the logs in the system are shown for the past three releases shows that there has been a considerable growth in the system. Finally, we have received the approximate figure of 20,000 and more logs generated in a semester (figure 6). This proves that the system is having a real good response and is going towards the full adoption by the department of Computer Science.

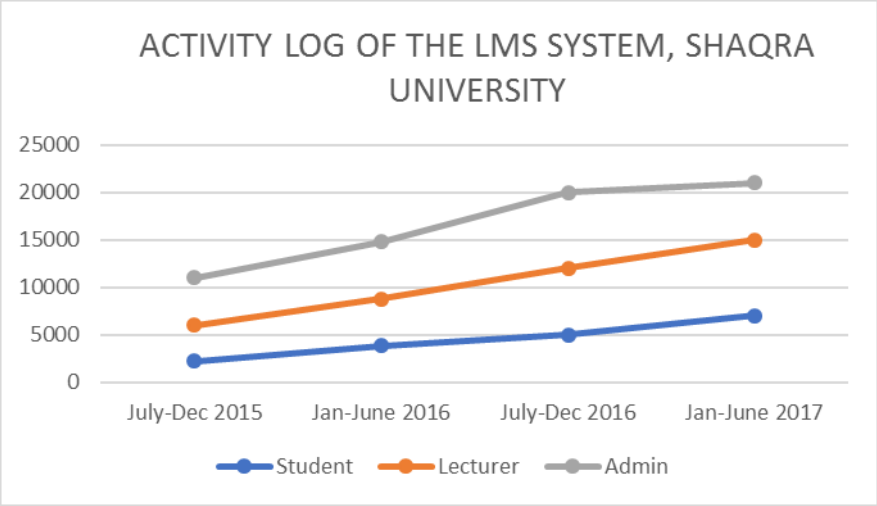

Figure 6: Activity Logs in the Moodle System based on System generated Logs

4. User Acceptance and Testing

In order to test the user acceptance of Moodle, this study applied Technology Acceptance Model (TAM). TAM is considered one of the most dominant theory widely used in the IS and IT studies. Many studies have been applied TAM to test user acceptance of information technology, for example ATM was developed by [23], based on theory of reasoned action (TRA) which created by [24].

4.1 Theoretical Model of TAM

TAM proposes that user attitude towards using technology will be influenced by perceived ease of use and perceived usefulness of technology. Perceived usefulness defined as" to which degree the user believes that using a particular system will improve his or her productivity in the work", while perceived ease of use defined as" to which degree the user believes that using a particular system would be free of effort". Besides, user attitude towards using technology are predictors of behavioral intentions and actual usage. in the same time, perceived usefulness of technology was also considered as predictor of perceived ease of use [23].

Figure 7 depicts the research model adopted in the study. It is a reduced TAM model, excluding attitude. Reference [25] empirically proved that the attitude element did not fully mediate the effect of perceived usefulness on intention to use. There is no intention to examine antecedents to perceive usefulness and perceived

ease of use, thus the external variables construct in the original TAM are also not included in this study[23].

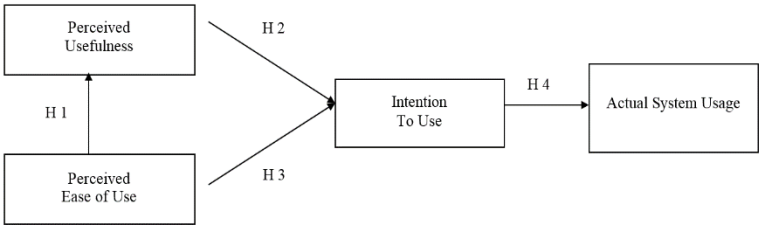

Figure 7: The TAM Model [25]

Based on the proposed model, the following hypotheses are proposed

H1: Perceived ease of use has a significant effect on the perceived usefulness of the Model.

H2: Perceived usefulness has a significant effect on intention to use.

H3: Perceived ease of use has a significant effect on intention to use.

H4: Intention to use has a significant effect on actual Model use.

4.2 Sample Questionnaire and Design

In order to validate the proposed model presented in Figure 1, data were collected from actual user of Moodle system. A questionnaire was designed and sent via the system to all users. Invitations to participate were sent to all the system users, students and lecturers. Scale items appearing on questionnaire were based on conceptual research by[23]. The questionnaire contained 14 items.

A total of 743 usable responses were obtained. All items were measured on five-point Likert-type scales. The scales went from strongly disagree (1) to strongly agree (5). The questionnaire contained 14 items. A total of 743 usable responses were collected. Of the respondents 703 were students, and only 40 were lecturers. Nearly half of the respondents were males.

Data collected from respondents was analyzed using SPSS (Statistical Package for Social Scientists). In order to ensure consistency and stability of the scale, the reliability tested by using the most common used form to test the reliability which is the internal consistency test.

Cronbach's alpha was used to assess the internal consistency for every factor in this study. A commonly accepted level of Cronbach's alpha value is above 0.7., as shown in the below table, the result of internal consistency test indicated that all factors were above the acceptable level[26].

Table 2: Internal Consistency Tests

Variables	No of items	Cronbach's alpha value
Perceived ease of use	4	0.768
Perceived usefulness	4	0.801
Intention to use	3	0.757
actual system use	3	0.864

Among the four variables, had the Intention to use lowest reliability score of 0.757, while the actual system use had the highest reliability score of 0.864. The overall reliability for the entire scale was also calculated, demonstrating good Cronbach's alpha value of 0.908. Factor analysis is conducted in order to identify the underlying dimensions of e-government service quality. Factor analysis is used for data reduction and summarization[27]. Factor extraction using Principal component analysis (PCA) and factor rotation using varimax were performing in order to conduct factor analysis. After rotation, the first factor accounted for 33.43 % of the variance, the second factor accounted for 11.46%, the third factor accounted for 9.97%, and the fourth factor accounted for 7.05%. Table 2 displays the items and factor loadings for the rotated factors, with loadings less than 0.40 deleted to improve validity. Only factor that have eigenvalues greater 1 considered significant in this study[26]. The total variance for all four factors accounted for 61.91 of the total variance in the original 14 items.

Table 3: Variance values for 4 Factors

Items	Factor 1	Factor 2	Factor 3	Factor 4
PEU1	0.801			
PEU2	0.663			
PEU3	0.594			
PEU4	0.728			
PU1		0.751		
PU2		0.740		
PU3		0.707		
PU4		0.610		
IU1			.718	
IU2			.646	
IU3			.694	
ASU1				.605
ASU2				.642
ASU3				.605
% of variance explained	33.43	11.46	9.97	7.05
Extraction Method: Principal Component Analysis [28]. Rotation Method: Varimax with Kaiser Normalization[29]. a. Rotation converged in 7 iterations.				

The researcher also conducts the simple linear regression in order to study the relationship one by one between

the independent variables and dependent variables. Summary of regression results presented in table below.

Table 4: Regression Results Summary

Hypothesis	Path	R Square	F	Sig.	Results
H1	PEU ----> PU	.480	257.621	.000	Supported
H2	PU ----> IU	.022	6.407	.012	Supported
H3	PEU ----> IU	.255	96.071	.000	Supported
H4	IU ----> ASU	.102	31.874	.000	Supported

4.3 Results from TAM

As can be seen from observation table, a regression analysis was performed, with perceived ease of use as an independent variable and perceived usefulness as the dependent variable. The f statistic produced (F=257.621) was significant at 0.00 level where the P value <0.00. Furthermore, the beta value was positive and significant at 0.00 where the P < 0.00. This means that 48.0% of the variance (R-square) in perceived usefulness has been significantly explained by Perceived ease of use factor. Thus, hypothesis H1 is supported. Hypothesis 2 (H2) and Hypothesis 3 (H3) were tested by regressing both perceived ease of use and perceived usefulness on Intention to use the Moodle. The beta value for both factors were positive and significant at 0.012 where the P < 0.05. This means that 2.2% of the variance in Intention to use has been significantly explained by perceived ease of use, while 25.5% of the variance explained by perceived usefulness. Both perceived ease of use and perceived usefulness have a significant influence on intention to use. Accordingly, H2 and H3 are both supported. Consistent with prior research (Davis, 1989 & Hu and his colleagues 1999), Intention to use had a significant effect on actual system use, with p < 0.000. As indicated in the table that 1.02% of the variance in actual system use has been significantly explained by intention to use. Thus, H4 is supported.

This study examined TAM using student and lecturer acceptance of model system. In general, TAM was completely supported. Based on data collected from 743 students and lecturers, the utility of TAM for explaining acceptance of model system by students and lecturers was evaluated. Results showed that both perceived ease of use and perceived usefulness are important in determining intention to use model system. In agreement with literature, perceived usefulness was found to have a significant influence on students and lecturers' intention to use the model. A clarification might be that students and lecturers are agreeable to adopt beneficial applications of model system, and this may suggest that students and lecturers tend to focus on the usefulness of the system itself. Specifically, this study found perceived ease of use also affects the intention of using the model which plays a key role in adoption of model as e-learning. As one of the main objectives of adopting the model system is to provide a fast and convenient access of information and services provide via the model. In this context, providing proper user training is vital for directing students and lecturer' perception of the usefulness and ease of use of the technology. This study empirically found that the intention to use factor did

fully mediate the effect of actual use of model. The results of this study show that TAM can be used to explain the students and lecturer's acceptance of model system as e-learning technology.

5. Discussion

This section provides a brief description of the problems and the probable favorable points that were encountered in the adoption of Moodle. Various user groups (Lecturers, students or administrators) have had different levels of difficulties and solutions for the adoption of the new system. Some difficulties were found and these difficulties have been eliminated in order to opt for a problem-free learning management system, which is very useful for the future.

5.1 Adoption problems

Moodle is very user-friendly system and it is designed in order to make the learning and teaching process easy. The Department of computer science and IT found out the problem with the learning and teaching methodology on a common scale. Since the university have nine different remote centers (i.e branch campuses), a common platform was required, so as to distribute the required and need for material to all staff members and students that were generic in nature. A unified syllabus means that the whole University takes care of all contents that are used by every branch campus. However, it becomes difficult without a proper learning management system platform to overcome this issue. Many staff members have a problem, in which they are not able to share the common knowledge and the syllabus as it is required. However, there were many problems that were encountered during the adoption in the early phases of the system.

5.1.1 Accessibility of the system across the network: the learning management system contains all the materials required for the learning and teaching process, which is important for both students and lecturers. However, during the first semester of the adoption, the system was working for only the college of computing and IT. It was not accessible to all the other branches in the system yet. The remaining eight branches were not aware about the adoption. The second phase of the system adoption led the other branch campuses to demand the deployment of the system at their location as it is required. The local intranet was used in the college of computing and IT for accessing the information. But it was difficult for the system to run at all the nine branch campuses. Thus, the problem of accessibility was a bigger issue. However, the solution of this problem was made possible with the help of virtual private networks (VPN). The use of VPN scaled up all the remote sites. Now the system is fully functional and it is accessible across all the nine branch campuses of the University.

5.1.2 Linguistic Barrier for the non-English natives: The Saudi Arabian region, makes use of Arabic as the native language. Any LMS system must ensure that it supports the local language as well as English as the second language. It was a big hurdle to match up the requirement of the Arabic language over English. However, the language packs of Moodle make it possible for the adoption of the system in Arabic as well as in English with very simple add-ons in the language packs. The system is compatible with more than 100 languages as required. However, this system is adopted only in Arabic and English and the staff members as well as the students are capable in working with the system without any problems.

5.1.3 Human Adaption as a behavioral ethic in the system: howsoever a smart system can be, unless it is

accepted by the intended users, it takes time to work properly. The technical nature of the system was a big hurdle that was faced in the early days of the adoption of the learning management platform. But slowly as the system was found useful and the problem of information sharing was removed, all the users were contented enough to use the system. The perspective of the users has changed enormously and the system has been accepted on a very wide scale.

5.2 Favorable Points

The Moodle system had been an exciting platform for sharing the information between lecturers and students. But it is similar type of LMS systems that are available in the market. However, some exciting favorable features are available in the Moodle system that makes it unique and strong so that it could be used as a complete academic platform and a very sound learning management system. As discussed above in the Section 2, a current design and statistics of the Moodle based system at the university shows that the system is well adapted by the students and the staff members of computer Science department. The report is generated from the system report module and it gives a complete outlook of the current system. The rise from 36 courses towards 455 courses by itself shows that in a span of 2 semesters, there was a 12-times growth in the systems.

There are many exciting features that are used by the system at this stage and are very favorable to both students and lecturers. The LMS system adopted by the CCIT makes use of these extraordinary features to provide quality education and ease of working. Some of the system features are shown below:

- System design
- Gradebook
- Assignments submission
- Online exams
- Scalable exams
- Plagiarism check
- Videoconference
- Exciting teams
- SMTP integration
- SSL encryption
- Virus resistant
- User hierarchy
- Web-based services

6. Conclusion and Future Work

The College of computing and IT was in a need for a learning management system, and for that Moodle was adopted as an open source and license free platform to be the LMS of choice to the college. In a short span of time (i.e. two years), the entire college of computing and IT across all the branch campuses of Shaqra University have adopted the system because of its popularity and exciting features. The customizable design and user-friendly environment make it possible for the adoption of the system in the University. Thus, it can be

concluded that Moodle has proven to be a substantial system that can be used for the entire University. The system can be adopted very easily and it is very secure to be used by individuals. Since the classic system of paper work and non-digital environment was into use, it was difficult for the users to adopt very fast. However, the strong design and features of the Moodle make it possible for all users to adapt to the system in CCIT without failure. Running exams and the evaluation on the go make this system very elegant and effective to be used by the staff members as well as the students.

Learning is a never-ending process and the adoption of any system is also the same. Improvements is always required at any stage of a system, and thus, the LMS adopted by CCIT will require various future enhancements. Moodle is a very simple and easy-to-use system and it is customizable. The customization maybe updated and revised as and when required. Based on the feedback collected from various users, the LMS must be accessible anywhere not only in within the University. Until this moment, the system is only accessible within the University network across the 9 branch campuses. However, it is expected that in the future, the system will be uploaded to a restricted public IP so that it could be accessible from anywhere.

The first phase of the system was accepted by all the CCIT branches effectively and it is running smoothly. Thus, the future expectations from the system shall be a complete adoption of the system for the entire University network which will not only target the students of computer science and IT, but it will be available to all students of the University, irrespective of their branch and / or college. The use of the system with reference to all the users should be made more simple and effective with the integration of on-time SMS systems and GPS systems. Moodle is very effective and efficient, but it lacks some implementations. The configuration driven design and open source makes it possible for the developers to release various different security patches and updates as required. Many of the developers are trying hard to create various plug-ins that can be used in the system to make it very feasible and convenient for the intended users. This learning management platform is expected to confirm risk management for critical data and solutions that should have been more strong and particular. The common backup management system of the Moodle is still way behind with reference to cloud-based services. The cloud-based services must be integrated with the Moodle platform to make it more exciting and risk-free. Some more security enhancements like one-time password (OTP) and real-time emails for login and security updates must be integrated in the system. The utilization of Google technologies such as Google SMS and Google SMTP can be done to achieve these features very easily. The Moodle community is a very large community which have users across the world and had proven that open source has a long way to go. The use of various different learning management systems like blackboard and D2L is not encouraged at all due to their high cost of license and maintenance. The Moodle system is expected to provide these facilities and features without any licensing cost in the future as well.

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